AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

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1. (currently amended): A method for increasing the signal to noise ratio of a receive wire-line system, said method comprising ~~the steps of~~:

receiving receive signals from a wire-line;

amplifying ~~said~~ the receive signals to form amplified signal-plus-noise signals;

creating in-phase and quadrature digital versions of ~~said~~ the received signals, wherein ~~said~~ the in-phase and quadrature versions are about ninety degrees out of phase with respect to each other;

storing ~~said~~ the signal-plus-noise signals in a memory device;

forming at least one matrix digitally representing a plurality of values, ~~said~~ the values consisting of ~~said~~ the in-phase and quadrature versions of ~~said~~ the receive signals;

performing an iterative process on data contained in ~~said~~ the matrix to determine an estimate of the magnitude and polarity of the noise portion of the signal-plus-noise for each trial; and,

subtracting each estimated noise value from the stored signal-plus-noise version to obtain a noise-reduced signal,

wherein the noise-reduced signal is a broadband signal exhibiting a reduction in any type of noise.

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2. (original): A method as claimed in claim 1 further comprising:

forming left and right topological groupings of digital numbers about a topocentric reference that corresponds to a zero voltage injection from pre-programmed and memorized voltage value injection patterns that comprise incremental successively increasing positive and negative steps in each of a plurality of rows, each row having similar increments with the same topocentric zero reference.

3. (original): A method as claimed in claim 1 further comprising:

using a topographic digital number array, that covers a positive and negative (i.e. bipolar) range and is in equilibrium about a topocentric value, to detect when the polarity of the noise portion of a signal-to-noise combination changes from positive to negative or from negative to positive in response to an injection of a predetermined value probe.

4. (original): A method as claimed in claim 1, wherein said iterative processing comprises:

sequentially applying a series of digital value probes to said data to alter a value representing signal-plus-noise and wherein several iterations produce an estimate of a noise portion of the signal-plus-noise by algebraically summing resultant values of the several iterative steps.

5. (withdrawn): An iterative value programmer operable to provide digital value steps, or probes, used in conjunction with a sensor operable to sense a change caused by each step or probe in a bipolar fashion, wherein an amount of said change is determined for both positive and negative values of a noise component of signal-plus-noise samples in a symmetric fashion.

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6. (currently amended): A method as claimed in claim 4, ~~firther~~ further comprising:

providing at least one of the rows ~~pattern of aforementioned pre-programmed plus and minus values~~ of the matrix that is reserved in a pre-programmed manner such as to cover the column injectors ~~form~~ from minus to plus ~~instead of the aforementioned plus to minus but in a similar patter except for the polarity sense;~~

~~opposite polarity "senses" provide sharper the error responses of column difference to yield comparison~~.

7. (original): A method as claimed in claim 2, further comprising:

forming a topographical number array rendered in equilibrium, and symmetrical about the topocentric zero reference, by shifting a row of the array corresponding to a signal-to-noise entry that has a minimum deviation of said entry from the average of the two or more entries, such average referenced as a first row and these two aforementioned rows having the plus and minus increment patterns reversed with respect to each other.

8. (original): A method as claimed in claim 1, further comprising

providing a processing means for performing said iterative processing wherein bandwidth and signal handling capabilities of the system are not adversely compromised and wherein a time delay of said processing means is short with respect to said method; and

utilizing the short time delay to permit signal-to-noise to be significantly improved.

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9. (original): A method as claimed in claim 4, further comprising:

providing time needed to perform the iterative process by thereby realizing means for achieving "near-real time" behavior of the sensing system by executing the iterations at a slower rate than the basic receipt of signal information, which corresponds to the "Nyquist" sampling rate, which is in accordance with the signal modulation characteristics, such iterative process having several iterations accomplished at a fast processing speed, wherein the iterations occur while the received samples are stored and remembered while the several iterations take place and wherein the desired relative processing speed is controlled by the division of the sampling frequency as determined by an advisor ratio, thereby achieving a prescribed known rate and a fixed tolerable time delay.

10. (currently amended): An apparatus operable to accomplish the method of claim 4 wherein sensing and control abilities of the topographical number array are needed to execute the converging iterative process, said ~~apparatys~~ <u>apparatus</u> being enabled by the delay and storage features that maintain the sign apportion of this process constant so as to render the variations that occur from one iterative to the next one to consist primarily of the noise changes.

11. (withdrawn): An integrated circuit device comprised of means of performing primary simple functions namely digital addition (or subtraction) to form a topological array matrix consisting of two or more rows an a plurality of contiguous left hand, and right hand, columns which together with a means of utilizing column shifting (as controlled by a iterative programmer) so as to provide from the chip a "bipolar" means of sensing of the consequences of each iterative probe value supplied by such a program with these consequences being interpreted equally well without regard for the net polarity of the noise portion of each signal-to-noise sample.

12. (withdrawn): An iterative programmer in accordance with claim 5, further comprising:

an integrated circuit device consisting of a chip, or a portion of a larger chip, that can interpret the response of each iterative probe to be used to help control said programmer so as to determine the magnitude and polarity of a subsequent probe, with each such decision made by a logic flow process.

13. (withdrawn): An iterative programmer in accordance with claim 5, further comprising:

an integrated circuit device consisting of one or more chips, or a portion of a large chip, operable to execute the series of steps that constitute the iterative process so as to converge in a

manner that provides an accurate noise estimate for each trial in accordance with said iterative process.

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14. (withdrawn): An integrated circuit devise on a chip, or group of chips, that hosts a specially structured numerical array or matrix as defined by claim 3 in which computed deviations form array values, which are signal level independent, are applied to one row of said matrix in the form of a plus or minus column shift results in the matrix being in equilibrium about the topocentric (the zero column) of the array and thereby enduring the matrix with the ability to serve as a change detector to sense progressive changes as caused by a series of iterative probes.

15. (withdrawn): An integrated circuit chip as claimed in claim 14 that executes a logic flow guided by means of a decision tree and thus, in an orderly fashion, reduces six possible consequences to a single choice of one value for a subsequent iterative probe, such choice consisting of an appropriate magnitude and polarity.

16. (withdrawn): An integrated circuit chip, or aggregate of chips, that performs an iterative process by using iterative probes (magnitude and phase) where consequences are determined by the decision logic results of claim 1 in a series of iterative steps each assessed as to topological changes so as to resulting in selection of an appropriate next probe value to cause a series of iterations that converge to a near zero conclusion and providing an algebraic sum

which is a close approximation tot he equivalent noise value, in digital form, which can be subtracted from the signal-to-noise value of each trail.

17. (withdrawn): A device in accordance with claim 15, further comprising:

a decision device operable to augment the decisions made for the early iterations by coupling some of the results from later iteration results back to the decision processor possible modifications in determining the magnitude of such iterative probe used in middle and later iteration based on a cumulative history from such iterative process.

18. (withdrawn): A receive system consisting of an arrangement of devices in accordance with claim 11, wherein said system further provides an output signal that is enhanced considerably with respect to the inherent noise that is present without such devices and arrangements and with such enhancement manifest in the strength of the carrier signal in a communication system.

19. (withdrawn): A receive system in accordance with claim 18 further operable to accommodate and interpret various forms of modulation of the carrier of said signal, such an ability being achieved by a succession of frames of information that are generated in near-real time to retrieve the modulated signal information that is less corrupted by said noise.

20. (withdrawn): A receive system in accordance with claim 19, further comprising:

an integrated circuit device capable of providing said frames of information to work in one or more pairs to form a paralleled processing arrangement in which separately remembered signal frame(s) can be captured and stored simultaneously so that the output of each can be utilized individually and serially to contract the desired noise-reduced signal by successive frames that provide the modulation characteristics of the sequence, all of this being done in a tolerably short and predetermined fixed time which is manifested as signal delay, without comprising bandwidth.

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21. (original): A method as claimed in claim 8, further providing a practical implementation of a non-stationery series of events that are executed in non-real time by an iterative probe and unique bipolar sensing method that result in improving the entropy of the system.

22. (original): A method as claimed in claim 1 further comprising:

implementing a comprehensive method of realizing near-real time processing that satisfies the "second law" of thermodynamics by achieving, during a tolerable known time departure (i.e. fixed "time delay") from real time, an estimate of the noise portion of the signal plus noise of said iterative process, said estimate serving as a statistical mechanic results such that when such a quantity is subtracted, it is analogous to an introduction of energy at a lower temperature in a thermal system, thereby improving (i.e. lowering) the effective entropy of each trial.

23. (withdrawn): Means of enhancing signal outputs provided from a gateway of a service provider, such enhanced outputs being provided in a digital format as a result of an overall iterative process which substantially lowers an amount of internal noise normally present with the signal, such enhancement being able to improve a next process that receives such a signal to improve a source error rate, a realizable channel density and a multiplexing performance used to route information.

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24. (withdrawn): A device operable to enhance signals received at gateways that are part of a localized distribution area in a form that are in packets (with destination labels) in which such digital information is changed to analog from (with decompression if necessary) and converted with a digital to analog device to reconstruct an analog signal which is then converted to digital from by processing where both the signal and the locally generated noise are present in an interwoven combination to which an iterative processing scheme is applied to provide further relative enhancement of the signal by minimizing such noise.

25. (withdrawn): The device as claimed in claim 24 further comprising:

an interpreter operable to interpret the digitally represented signal more reliably and with a lower error rate, wherein enhanced performance results which can be traded-off for the same acceptable error rate to translate the improvement for higher channel density and/or longer range reception.

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26. (original): A method as claimed in claim 1 wherein said method enhances the receive signal at a gateway of an individual user, such improvement consisting of a stronger signal, relative to noise, at a user end of the overall process providing a longer communication distance and/or quicker access time potential.

27. (withdrawn): A method of realizing a cascading multiple stage improvement of an overall information control and distribution system using signal-to-noise improvement manifested in a variety of embodiments based in principals as described for the invention in the various forms herein the aggregated overall improvements potential can be used to help optimize the overall, as well as the individual subsystems parts, or the overall system in a way that can improve performance parameter such as channel capacity, shorter access time, better range and reliability, that are achieved in part by the increased multiplexing options.

28. (new): A method for increasing the signal to noise ratio of a receive system, said method comprising:

receiving receive signals;

amplifying the receive signals to form amplified signal-plus-noise signals;

creating in-phase and quadrature digital versions of the receive signals, wherein the in-phase and quadrature versions are about ninety degrees out of phase with respect to each other;

storing the signal-plus-noise signals in a memory device;

forming a topological number array (TNA) for at least two successive trials of receive signals, wherein the TNA contains data consisting of the in-phase and quadrature versions of the receive signals;

performing an iterative process on the data contained in the TNA to determine an estimate of the magnitude and polarity of the noise portion of the signal-plus-noise for each trial, wherein the iterative process consists at least of successively adding a series of equally spaced values to the data and determining a particular value that causes the noise portion to change polarity; and

subtracting each estimated noise value from the stored signal-plus-noise version to obtain a noise-reduced signal.

29. (new): A receive system comprising:

means for employing a wide system bandwidth by providing additional system noise resulting in an increased bandwidth to accommodate additional communication channels and for improving the reception of pulsed signals,

wherein the increased bandwidth provides broadband noise that can be processed rapidly using rapidly changing noise samples.

30. (new): A method as claimed in claim 4, further comprising:

selecting one of the probes such that the largest signal-to-noise improvement is achieved; and

performing the estimation of the noise portion of the signal-plus-noise for each of a plurality of cycles of a carrier signal associated with the receive signals.

31. (new): A method as claimed in claim 30, wherein the receive signals are provided in a modulated form and a demodulated result signal is formed based on the selected probe.

32. (new): A method as claimed in claim 1 further providing:

providing a time delay required such that the iterative process can be performed substantially in real time for each cycle of a carrier signal of the receive signal, wherein signal modulation is achieved such that the Nyquist criterion is satisfied for the modulation.

33. (new): A method as claimed in claim 32, wherein the signal modulation comprises phase modulation.

34. (new): A method as claimed in claim 32, wherein the iterative process on each cycle is performed on samples that have been stored.

35. (new): A method for increasing a signal-to-noise ratio in a receive system comprising providing at least two related iterative processes, one related to a receive signal of the receive system and one related to a noise sampling, iterative processes comprising:

providing a series of signal level assumptions (probe values) for each iterative process;

deriving an equivalent noise level by using a digital iterative noise estimation process, wherein the noise estimates are determined by algebraically summing several iterative digital values such that a cumulative sum becomes a close approximation to the actual value of the noise, but with the polarity reversed.

36. (new): A method as claimed in claim 35, further comprising:

determining an appropriate signal level by selecting a sample that provides a maximum signal-to-noise output, wherein both a positive and negative half cycle of a carrier signal sinewave is used to determine which signal sample corresponds to a minimum residual noise effect and wherein the value of the minimum residual noise effect corresponds to a maximum signal-to-noise result.

37. (new): A method of increasing signal-to-noise in a receive system comprising:

utilizing adjacent positive and negative half cycles of a carrier signal to determine a cycle match in which the positive half cycle amplitude matches the negative half cycle amplitude;

identifying a zero signal condition which corresponds to an optimum noise estimate from among a plurality of noise estimates.

38. (new): A method as claimed in claim 1, wherein the iterative process is performed for each cycle of a carrier signal as determined by a carrier frequency phasing with reference to a zero phase reference, resulting in a small predictable delay.

39. (new): A method as claimed in claim 38, wherein the noise estimate is obtained from one complete cycle of the carrier for a pulsed signal and the receive signal corresponds to an absence of carrier and the noise is reduced to a residual value providing the ability to detect each pulse of the signal.